

Patent Claims

1. Device for cultivating cells of the most diverse type, particularly human or animal cells, one culture each of cells of at least one specific type being established in a defined environment and the cells of the relevant culture being supplied with assigned, liquid nutrient media, growth factors, gases and the like in the process, characterized by the fact that the device (30) is equipped with cell cultivation equipment and incubation equipment of such a kind that they enable the cells established in at least one cell culture chamber (20) of the device (30) to adjust the living and growth conditions necessary in the individual case themselves.

2. Device according to claim 1, characterized by the combination of the following features:

a) Equipment (C) for starting a flow of freely selectable, defined, liquid media in the at least one cell culture chamber (20) in order to ensure a continuous supply for the cells that have been established there;

b) Equipment (D) for starting a flow of different gases with freely selectable concentrations into the at least one cell culture chamber (20) in order to ensure a constant, continuous gassing of the cells that have been established there;

c) Equipment (E) for a regulated and/or controlled heating of the at least one cell culture chamber (20) in such a way so as to ensure a constant temperature in there over the duration of an experiment;

d) Equipment (B) for a permanent microscopic observation of the cells established inside the at least one cell culture chamber (20), without samples of the cell culture being taken over the duration of an experiment;

e) Equipment (F) for a permanent measuring of all relevant cell culture parameters by means of suitable sensors integrated in the at least one cell culture chamber (20), and

f) The feedback control elements assigned to at least one cell culture chamber (20) for the purpose of optimizing the incubation conditions in the cell culture chamber (20).

3. Device according to claim 1 or 2, characterized by the fact that the device (30) is equipped with a given number of cell culture chambers (20) connected in series.

4. Device according to claim 1 or 2, characterized by the fact that the device (30) is equipped with a given number of cell culture chambers (20) that are connected in parallel.

5. Device according to one of the claims 2 to 4, characterized by means that serve to vary the type of liquid media and/or their directions of flow and/or their distribution and/or their flow volumes during the duration of a test.

6. Device according to one of the claims 2 to 5, characterized by equipment that serves to vary the type of gases and/or their directions of flow and/or distribution and/or gassing concentration over the duration of an experiment.

7. Device according to one of the claims 1 to 6, characterized by an equipment (25) that serves to permanently measure the temperature in the at least one cell culture in the at least one cell culture chamber (20) and to enter it as an actual temperature value into a corresponding temperature adjusting and/or control circuit so that the heating of the cell culture chamber (20) is adjusted and/or controlled accordingly.

8. Device according to one of the above-mentioned claims, characterized by at least one cell culture chamber (20) in which a gas-permeable membrane has been arranged in such a way that one cell culture of different types each may be established for the purpose of a direct co-cultivation of both cell cultures on both sides of this membrane; equipment for the starting of a first flow of media to the first side of the membrane, that means to the apical side with the first cell culture, and a second flow of media that is different from the first flow of media to the other side of the membrane, that means the basolateral side with the second cell culture, being provided.

9. Device according to one of the claims 2 to 8, characterized by a video-supported microscopic observation system (B) for observing the at least one cell culture in the at least one cell culture chamber (20).

10. Device according to one of the claims 2 to 9, characterized by a computer-controlled monitoring and control system (G), to which all data obtained by means of

- A permanent microscopic observation of the at least one cell culture inside the at least one cell culture chamber (20) and/or
- A permanent measuring of the relevant cell culture parameters and/or
- A permanent measuring of the temperature in the at least one cell culture inside the at least one cell culture chamber (20)

can be transmitted for further processing and a subsequent corresponding actuation of the feedback control elements.

11. Device according to one of the claims 2 to 10, characterized by a software-aided measuring system for a permanent measuring of the relevant cell culture parameters.

12. Device according to one of the above-mentioned claims, characterized by the fact that the cell culture chambers (20) are integrated into a closed cell chamber group (A) arranged on a base (21) that constitutes a heating system (E) for incubation.

13. Device according to one of the above-mentioned claims, characterized by the use of the device for an indirect co-cultivation, different biological systems (that means types of tissue/cells) being connected in series in suitable cell culture chambers (20).